



APPLICATION OF NATURAL ENVIRONMENT IN TEACHING-LEARNING BIOLOGY

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ABSTRACT

The natural environment encompasses all living and non-living things occurring naturally, meaning in this case not artificial. The natural environment has two components Biotic components and Abiotic components. Biotic components are the animals and plants or living things and Abiotic components are the air, water, natural gases, soil and rocks etc. available in the environment. The inter dependency among all components is observed in the forms of ecosystems and bio-geo-chemical cycles in natural environment. The natural environment may act as a source of study material in study of Biology. In this study the syllabus of the senior secondary biology of CBSE is used to observe the effectiveness of natural environment. In this study the finding identifying the concepts of theoretical studies and experimental studies of biology mentioned in the syllabus of senior secondary biology and then calculate the total number of theoretical concepts and experimental/activity concepts and at the next step the concepts identified from the natural environment as teaching-learning material in biology study, their relationships with theoretical and experimental concepts in biology syllabus to prove then natural environment is also an effective resource material in teaching-learning strategy of biology in the forms of field study, field trip or study tour of biology as well as environmental study at senior secondary level.

KEY WORDS: Natural environment, components of Natural Environment, content analysis and environmental concepts.

Natural environment:

The Natural environment encompasses all living and non-living things occurring naturally on Earth or some region thereof. It is an environment that encompasses the interaction of all living species. The concept of the natural environment can be distinguished by components:

Complete ecological units that function as natural systems without massive human intervention, including all vegetation, microorganisms, soil, rocks, atmosphere, and natural phenomena that occur within their boundaries.

Universal natural resources and physical phenomena that lack clear-cut boundaries, such as air, water, and climate, as well as energy, radiation, electric charge, and magnetism, not originating from human activity. The natural environment is contrasted with the built environment, which comprises the areas and components that are strongly influenced by humans. A geographical area is regarded as a natural environment. It is difficult to find absolutely natural environments, and it is common that the naturalness varies in a continuum, from ideally 100% natural in one extreme to 0% natural in the other. More precisely, we can consider the different aspects or components of an environment, and see that their degree of naturalness is not uniform. If, for instance, we take an agricultural field, and consider the mineralogical composition and the structure of its soil will find that whereas the first is quite similar to that of an undisturbed forest soil, the structure is quite different.

COMPONENTS OF ENVIRONMENT

The components are classified in terms of biotic and abiotic based upon life. The biotic components are further listed as producers, consumers and decomposers and the abiotic components are classified as climatic (water and air) and edaphic (land).

The components of environment are listed as :

- 1 Hydrosphere (water)
- 2 Atmosphere (air)
- 3 Lithosphere (land)
- 4 Biosphere (fauna, flora and Microbes)
- 5 Anthrosphere (Man made things)

1. Hydrosphere:

The hydrosphere is the combined mass of water found on, under, and above the surface of a planet, minor planet or natural satellite.

It has been estimated that there are 1386 million cubic kilometers of water on Earth. This includes water in liquid and frozen forms in groundwater, oceans, lakes and streams. Saltwater accounts for 97.5% of this amount. Fresh water accounts for only 2.5%. Of this fresh water, 68.9% is in the form of ice and permanent snow cover in the Arctic, the Antarctic, and mountain glaciers. 30.8% is in the form of fresh groundwater. Only 0.3% of the fresh water on Earth is in easily accessible lakes, reservoirs and river systems. The total mass of the Earth's hydrosphere is about 1.4×10^{18} tonnes, which is about 0.023% of Earth's total mass. About 20×10^{12} tonnes of this is in Earth's atmosphere (for practical purposes, 1 cubic metre of water weighs one tonne). Approximately 75% of Earth's surface, an area of some 361 million square kilometers (139.5 million square

miles), is covered by ocean. The average salinity of Earth's oceans is about 35 grams of salt per kilogram of sea water (3.5%).

2. Atmosphere:

An atmosphere is a layer of gases surrounding a planet or other material body, that is held in place by the gravity of that body. An atmosphere is more likely to be retained if the gravity it is subject to is high and the temperature of the atmosphere is low.

The atmosphere of Earth is composed of nitrogen (about 78%), oxygen (about 21%), argon (about 0.9%) with carbon dioxide and other gases in trace amounts. Oxygen is used by most organisms for respiration; nitrogen is fixed by bacteria and lightning to produce ammonia used in the construction of nucleotides and amino acids; and carbon dioxide is used by plants, algae and cyanobacteria for photosynthesis. The atmosphere helps protect living organisms from genetic damage by solar ultraviolet radiation, solar wind and cosmic rays. The current composition of the Earth's atmosphere is the product of billions of years of biogeochemical modification of the paleoatmosphere by living organisms.

The term stellar atmosphere describes the outer region of a star and typically includes the portion above photosphere. Stars with sufficiently low temperatures may have outer atmospheres with

3. Lithosphere:

A lithosphere is the rigid, "outermost shell of a terrestrial-type planet or natural satellite that is defined by its rigid mechanical properties. On Earth, it is composed of the crust and the portion of the upper mantle that behaves elastically on time scales of thousands of years or greater. The outermost shell of a rocky planet, the crust, is defined on the basis of its chemistry and mineralogy.

4. Biosphere:

The biosphere is the worldwide sum of all ecosystems. It can also be termed as the zone of life on Earth, a closed system (apart from solar and cosmic radiation and heat from the interior of the Earth), and largely self-regulating. By the most general biophysiological definition, the biosphere is the global ecological system integrating all living beings and their relationships, including their interaction with the elements of the lithosphere, geosphere, hydrosphere, and atmosphere. The biosphere is postulated to have evolved, beginning with a process of biopoiesis (life created naturally from non-living matter) or biogenesis (life created from living matter), at least some 3.5 billion years ago.

5. ANTHROSPHERE:

The anthrosphere is that part of the environment that is made of modified by humans for use in human activities and human habitats. As human technology becomes more evolved, such as the impact of human activities on the environment potentially increases.

CONTENT ANALYSIS AND ENVIRONMENTAL CONCEPTS

Content analysis is a research method for studying communication artifacts. Social scientists use content analysis to quantify patterns in communication. Practices and philosophies of content analysis vary between scholarly communities. They all involve systematic reading or observation of texts or artifacts which

are assigned labels (sometimes called codes) to indicate the presence of interesting, meaningful patterns. After labeling a large set of texts, a researcher is able to statistically estimate the proportions of patterns in the texts, as well as correlations between patterns. Computers are increasingly used in content analysis. Popular qualitative data analysis programs provide efficient work-flow and data management tools for labeling. Simple computational techniques can provide descriptive data such as word frequencies and document lengths. Machine learning classifiers can greatly increase the number of texts which can be labeled, but the scientific utility of doing so is a matter of debate.

Content analysis is also useful in the planning of lesson for effective teaching-learning activities in the classroom. Through content analysis, it is also possible to identify the concepts (contents) and their subdivisions subconcepts or subcontents (teaching points) involved in units of the syllabus.

In this study the syllabi of XI and XII standard of Biology were analysed and divided into concepts and subconcepts of each units as under :

- (i) Theoretical contents (concepts) and sub-contents (teaching points)
- (ii) Experimental contents (concepts) and sub contents (teaching points)

After analysis of syllabi, the resembled contents and sub contents from environment (natural as well as manmade) were observed and they involved in the syllabi and find out following changes in the content analysis or syllabi of XI and XII class Biology.

(A) XI class Biology		
Experimental concepts	-	18%
Theoretical concepts	-	67%

After inclusions of concepts from Environment

Experimental concepts	-	18%
Theoretical concepts	-	36%
Concepts from Environment	-	46%
Experimental sub concepts	-	44%
Theoretical sub concepts	-	56%

After inclusions of sub concepts from Environment

Experimental sub concepts	-	22%
Theoretical sub concepts	-	25%
Sub concepts from Environment	-	53%

(B) XII CLASS BIOLOGY		
Experimental concepts	-	18%
Theoretical concepts	-	82%
After inclusions of concepts from environment		
Experimental concepts	-	18%
Theoretical concepts	-	47%
Concepts from Environment	-	43%
Experimental sub concepts	-	19%
Theoretical sub concepts	-	81%

After inclusions of sub concepts from environment

Experimental sub concepts	-	9%
Theoretical sub concepts	-	39%
Sub-concepts from environment	-	52%

CONCLUSION:

Natural environment with manmade environment is also the useful in teaching-learning biology at senior secondary level in Indian Education system. Study with environment is also useful to less strength of syllabi with complete Biological Informations and fulfilments of objectives.

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